

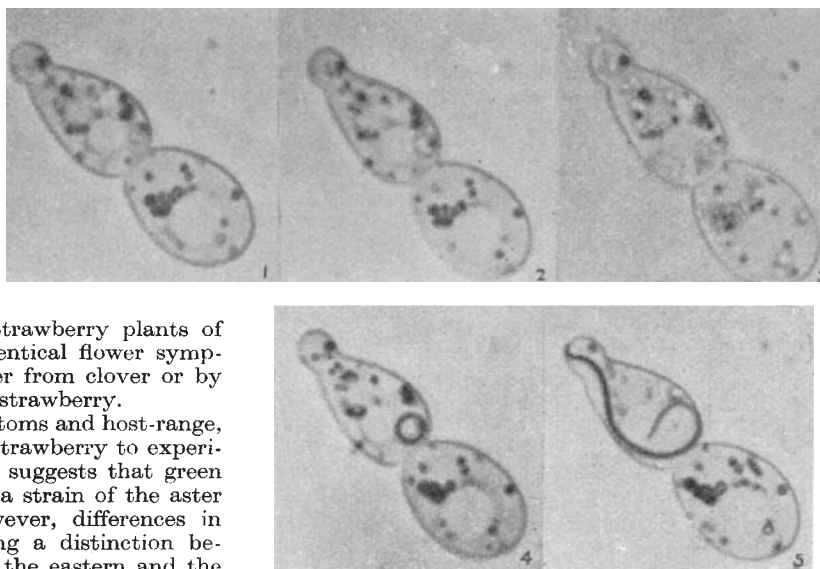
Both species failed to infect the strawberry and *D. indica* test plants, and the relationship between the leafhopper-transmitted virus and green petal disease was determined by transmission effected by dodder. *Cuscuta subinclusa*

D. and H. transferred the virus from clover to strawberry and *D. indica* plants, which developed the characteristic leaf and flower symptoms of green petal disease. Strawberry plants of the variety Lassen produced identical flower symptoms whether infected by dodder from clover or by grafting to green petal-infected strawberry.

The general similarity in symptoms and host-range, and in the resistance shown by strawberry to experimental infection by leafhoppers, suggests that green petal disease may be caused by a strain of the aster yellows virus. There are, however, differences in symptoms on all hosts, implying a distinction between the green petal and both the eastern and the western aster yellows viruses.

The frequent occurrence of the disease in isolated strawberry fields suggests that the green petal virus may be widespread in clover. The prominent phylloidy of the clover flowers (Fig. 1) should have directed attention to this disease, but it may have been attributed to damage by *Dasyneura* midges or phytomyzid mites. Infected red clover plants are stunted, with yellow leaf margins and veins, and a proliferation of axillary buds. White clover, although developing clear symptoms, seems less sensitive than red, many plants of which have been killed within a few months of infection.

This is the first virus shown to be transmitted by leafhoppers in Britain.



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¹ Posnette, A. F., *Plant Path.*, 2, 17 (1953).

² Frazier, N. W., and Thomas, H. E., *Plant Dis. Rep.*, 37, 272 (1953)

Cytoplasmic Structures in Yeasts

YOTSUYANAGI¹ has reported long, curved, cylindrical, occasionally branched, thread-like mitochondria in yeast cells by staining with tetrazolium. Although mitochondria are often clearly visible in living yeast cells, no other observer has ever reported long cylindrical cytoplasmic structures in *Saccharomyces*; we believe these thread-like structures are crystals of dye rather than mitochondria.

Figs. 1, 2 and 3 show a yeast cell at three optical levels after 15 min. staining with 2,3,5 triphenyl tetrazolium. The mitochondria in Fig. 1, in central focus, are darkly stained structures with clear centres, showing that the dye is deposited on the outside of the mitochondrion. Fig. 2 shows the same structures in low focus as dark spots; a deposit of tetrazolium is forming. Fig. 3 shows the same cell in high focus; the stained mitochondria appear as light areas due to the refraction of light by the granules. One hour later (Fig. 4) the deposit is much darker. After

another hour (Fig. 5) a crystal of tetrazolium extends across the cell. It is probably structures like this which Yotsuyanagi¹ and Ephrussi and Slonimski² have mistaken for mitochondria. In other cells crystals of dye appear as plates or short broad rods.

Ephrussi and Slonimski² and Yotsuyanagi¹ have proposed that three kinds of cytoplasmic granules are present in yeasts: (1) long cylindrical threads, (2) refractile granules which they do not think are mitochondria and (3) small 'true' mitochondria.

We have shown that deposits of formazan, especially the thread-like structures, are dye crystals, not resembling any normal structure present in the yeast cell.

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¹ Yotsuyanagi, J., *Nature*, 176, 1208 (1955).

² Ephrussi, B., and Slonimski, P. P., *Nature*, 176, 1207 (1955).

THE above comment on our papers starts with the assertion that "Yotsuyanagi has reported long, curved, cylindrical, occasionally branched, thread-like mitochondria in yeast cells by staining with tetrazolium". This is incorrect; the thread-like mitochondria referred to were stained with janus green and with Altmann's fuchsin. The observation of Williams, Lindgren and Yuasa that "deposits of formazan, especially the threadlike structures, are dye crystals not resembling any normal structure present in the yeast cell" is therefore irrelevant.

On the other hand, Williams *et al.* state: "Ephrussi and Slonimski and Yotsuyanagi have proposed that three kinds of cytoplasmic granules are present in yeasts: (1) long cylindrical threads, (2) refractile